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Date: July 25, 1997

To: Waste Disposal Inc. (WDI) Technical Workgroup

From: *Andria Benner*  
Andria Benner, Remedial Project Manager, WDI Superfund Site

Subject: Final EPA Subsurface Gas Contingency Plan

The purpose of this letter is to transmit a copy of the Final Subsurface Gas Contingency Plan to be conducted during late July and the month of August 1997 by the U.S. Environmental Protection Agency (EPA), with support from the Los Angeles County Department of Health Services and the City of Santa Fe Springs Fire Department. Staging of the trailers and other field equipment will be completed during the week of July 28, with sample collection beginning at the end of the week or during the week of August 4.

If you have any questions or need any additional information, please give me a call at (415) 744-2361.

Enclosures

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**FINAL**

**SUBSURFACE GAS CONTINGENCY PLAN  
WASTE DISPOSAL, INC. SUPERFUND SITE  
SANTA FE SPRINGS, CALIFORNIA**

**Prepared Under Contract DACW05-96-D-0008  
United States Army Corps of Engineers  
Sacramento District  
Sacramento, California**

**for the**

**United States Environmental Protection Agency,  
Los Angeles County Department of Health Services, and  
the City of Santa Fe Springs Fire Department**

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**Document No. 97-004.003**

**July 17, 1997**

**SUBSURFACE GAS CONTINGENCY PLAN  
WASTE DISPOSAL, INC. SUPERFUND SITE  
SANTA FE SPRINGS, CALIFORNIA**

**CERTIFICATION**

**THIS DOCUMENT WAS PREPARED UNDER THE  
DIRECTION AND SUPERVISION OF A QUALIFIED  
REGISTERED GEOLOGIST**



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**WASTE DISPOSAL INC.  
SUBSURFACE GAS CONTINGENCY PLAN**

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## LIST OF ACRONYMS

ASTM	American Society for Testing and Materials
CCR	California Code of Regulations
CGI	Combustible gas indicator
CIWMB	California Integrated Waste Management Board
COCs	Chemicals of concern
CRQL	Contract required quantitation limit
FID	Flame ionizing detector
FS	Feasibility Study
GC	Gas chromatograph
GC/MS	Gas chromatograph/mass spectrometer
LACDHS	Los Angeles County Department of Health Services
LEL	Lower explosive limit
OSHA	Occupational Safety and Health Administration
OVA	Organic vapor analyzer
PEL	Permissible exposure limit
PID	Photoionizing detector
PPBV	Parts per billion per volume
PPMV	Parts per million by volume
PRG	Preliminary remediation goal
QC	Quality Control
RI	Remedial investigation
SFSDPD	Santa Fe Springs Department of Planning and Development
SFSFD	Santa Fe Springs Fire Department
SOP	Standard operating procedure
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound
WDI	Waste Disposal, Inc.
WDIG	Waste Disposal Inc. Group



## **1.0 OVERVIEW**

### **1.1 OBJECTIVES**

This Subsurface Gas Contingency Plan for the Waste Disposal, Inc. (WDI) Superfund Site, Santa Fe Springs, California, presents the technical approach, rationale, logic, implementation sequence, and sampling/analysis protocols for the characterization of WDI site chemicals in soil gas and the indoor air assessment for these chemicals in structures present at the site. This Plan was developed to address the following objectives:

1. Identification of locations (1) within the site, (2) along all boundaries of the site, and (3) offsite within the 10-ft City of Santa Fe Springs right-of-way and 50-ft within the high school property with elevated volatile organic compound (VOC) and methane concentrations in soil gas indicative of the migration of wastes disposed at the site;
2. The use of soil gas data to target buildings and adjacent subsurface areas for further characterization;
3. The collection of site-specific indoor air monitoring data that may be used for a health risk assessment;
4. Obtaining current data documenting the presence of subsurface gas migration near and below buildings for U.S. Environmental Protection Agency's (USEPA) use in communicating site conditions to building owners and occupants;
5. The correlation, where possible, of soil gas data with indoor air concentrations data for the purpose of demonstrating a link between subsurface gas migration and indoor air quality; and,
6. The development of a current data base for all chemical constituents found at the site for purposes of evaluating the implementability of the proposed subsurface soil remedies.

### **1.2 INTERAGENCY COORDINATION**

During the summer of 1997, as part of a coordinated effort, the USEPA and the Los Angeles County Department of Health Services (LACDHS) will be conducting investigative studies and indoor air monitoring at the WDI site. Assistance will be provided by the City of Santa Fe Springs Department of Planning and Development (SFSDPD) and Santa Fe Springs Fire Department (SFSFD).

A portion of the field investigations will be performed by the Waste Disposal Inc., Group (WDIG) which comprises some of the firms potentially responsible for the disposal of wastes at the site. WDIG's activities will occur in the open field and areas adjacent to buildings at the site.

WDIG will be installing additional soil gas wells, groundwater monitoring wells, and will be evaluating the feasibility of removal of gas from below the site using a soil vapor extraction process. WDIG will also be collecting data to support the design of a soil cover over the site that will prevent water infiltration into buried wastes and will be used to control migration of gases below the site.

USEPA will be performing additional studies of the extent of gas contamination below the site through the installation of temporary monitoring probes of depths to up to 30 feet below the ground surface. USEPA will also be sampling air inside of buildings for the presence of chemicals found below the buildings that indicate migration of wastes from soils into the buildings. USEPA's efforts will be supplemented by LACDHS who will be monitoring indoor air for the presence of methane gas. If methane gas is found inside the buildings, then the SFSFD will become involved to ensure that any methane gas buildup is abated. For areas of the site where chemical wastes or methane are found in soil gas or in buildings, USEPA and/or LACDHS will periodically visit those locations to monitor levels until the final remedies for the site are implemented.

### **1.3 SITE LOCATION AND HISTORY**

The WDI Superfund site is located in the city of Santa Fe Springs, Los Angeles County, California, on an approximately 40 acres of land divided into multiple parcels (Figure 1). The site is surrounded by industrialized areas to the north, west, and south, residential areas to the east, and a school athletic field along the northeastern corner (Figure 2).

The WDI site contains a buried 42-million gallon capacity concrete reservoir originally constructed above grade for crude petroleum storage. The reservoir was decommissioned in the late 1920s, but was used until the early 1960s for the disposal of a variety of liquid and solid wastes. There are no records on the specific quantities and types of materials disposed at the site, but based on remedial investigations of the area, wastes disposed included petroleum chemicals, solvents, sludges, construction debris, and drilling muds. Historical aerial photographs show that liquids were discharged to the reservoir and into bermed areas surrounding the reservoir (Figure 3).

In 1953, earthwork was initiated to cover the reservoir and site area with fill in advancement of preparing the site for subdivision and development. This earthwork was continued throughout the 1950s and was not completed until the early 1960s. Soil borings (EBASCO, 1989) indicate that the reservoir area may be covered by 5 to 10 feet of fill soil. Currently the site is divided into multiple lots with buildings constructed on most areas of the site except over the location of the buried concrete reservoir (Figure 2).

The WDI site was placed on the National Priorities List in July of 1987. USEPA conducted a remedial investigation/feasibility study (RI/FS) from 1988 to 1993 (EBASCO, 1989; USEPA, 1993). The RI was inconclusive regarding soil and groundwater contamination, but VOCs were

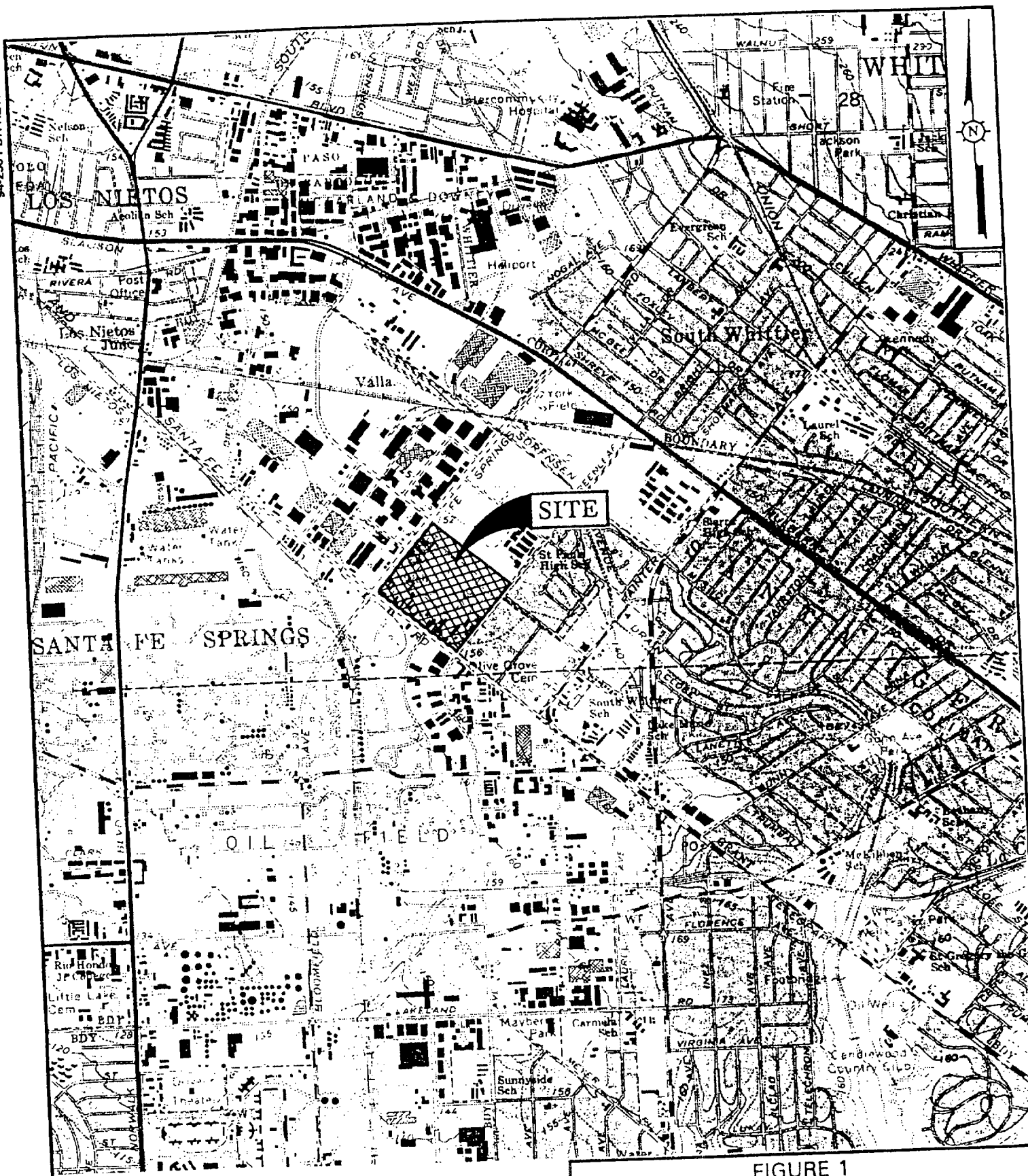


FIGURE 1

**SITE LOCATION MAP**

WASTE DISPOSAL, INC.  
SANTA FE SPRINGS, CALIFORNIA

ENVIRONMENTAL SOLUTIONS, INC.

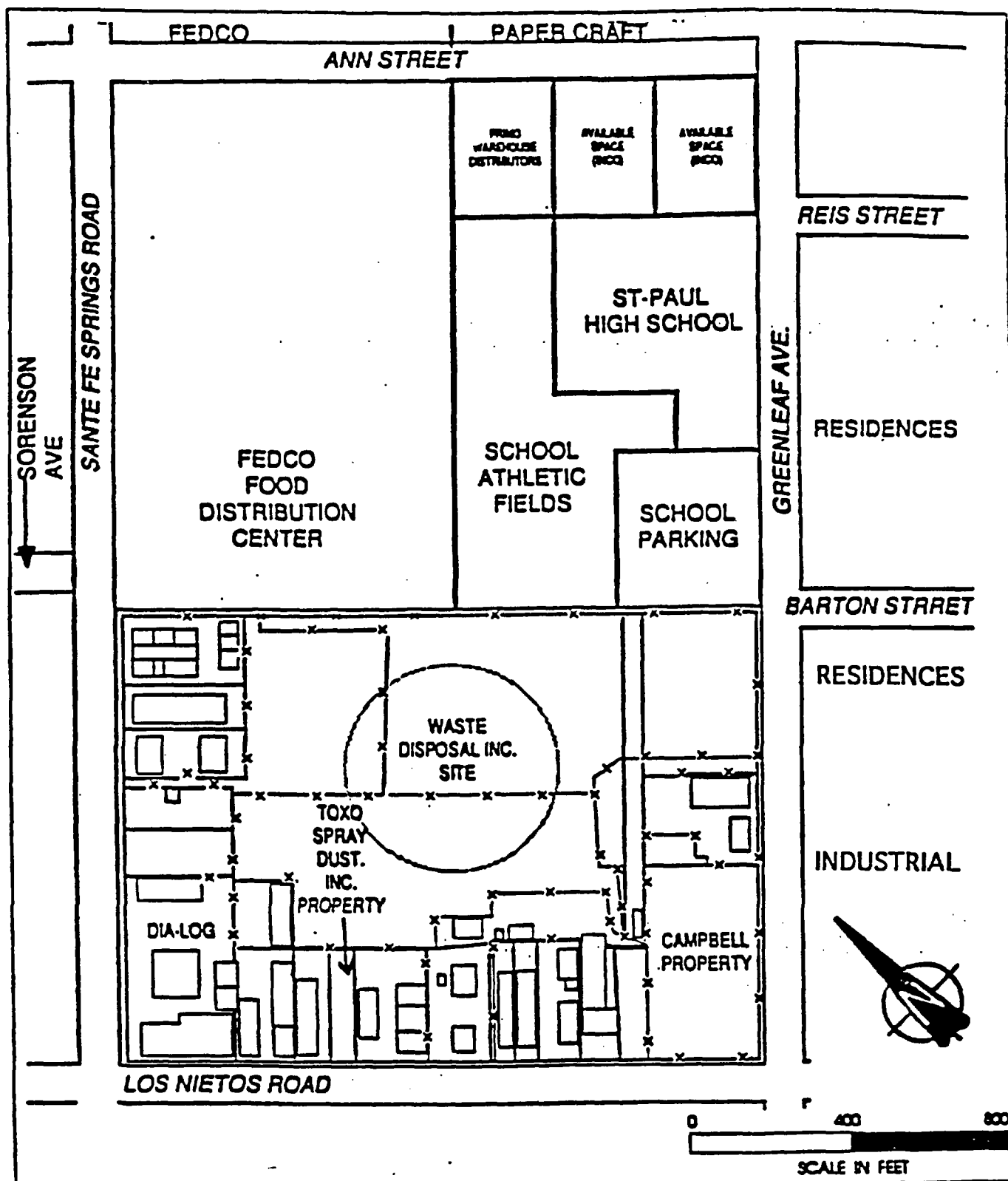


Figure 2  
WDI SITE IN RELATION TO ONSITE BUILDINGS  
AND THE IMMEDIATE SURROUNDING AREA

Source: USEPA, 1993 (FS Report)

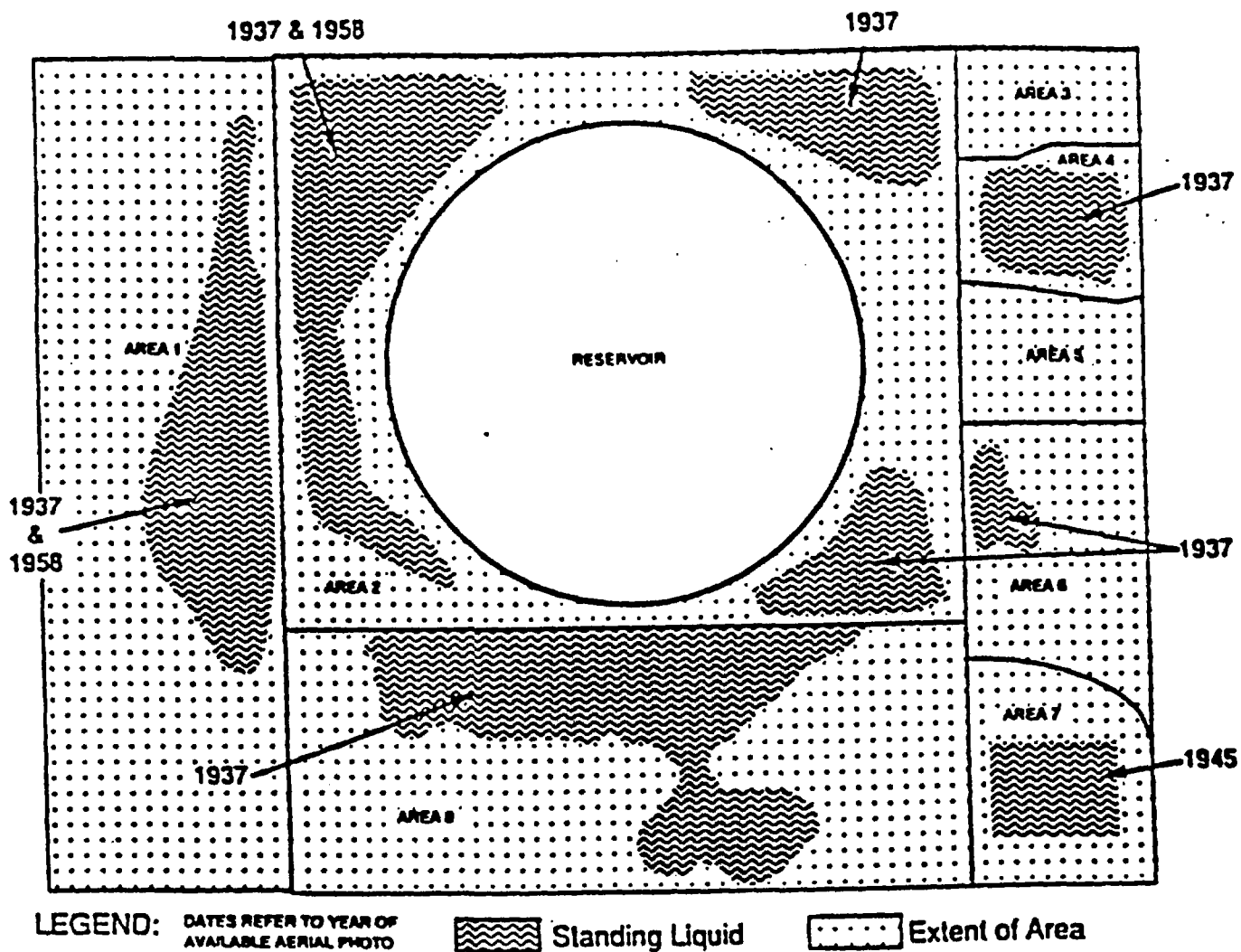


Figure 3  
EXTENT OF WASTE DISPOSAL ACTIVITIES  
OUTSIDE OF THE RESERVOIR, AS INDICATED  
BY HISTORICAL AERIAL PHOTOGRAPHS

Source: USEPA, 1993 (FS Report)

detected in soil gas, most notably benzene and vinyl chloride, as were explosive levels of methane. The potentially responsible party group (defined as the Waste Disposal, Inc. Group or WDIG) undertook in 1995 a second investigation of the site area, including the sampling of soil gas from selected monitoring wells (TRC, 1996). VOCs were reported for the soil gas samples, but the results were substantially different from those of the USEPA RI and TRC did not sample all of the monitoring wells. As a result of the differences between the two studies, current soil gas contamination conditions at the site are not fully understood. The 1989 RI and the 1995 WDIG study represent the only two investigations of soil gas contamination. The sampling of indoor building air was not performed during either study and currently there are no data on the presence or concentrations of VOCs or methane within buildings at the site.

Because the WDI facility received a variety of solid and semi-solid wastes, the site is being closed pursuant to State of California landfill closure regulations under California Code of Regulations (CCR) Title 14. Subsurface soil gas indoor air sampling addressed in this Plan also addresses compliance with California Integrated Waste Management Board CCR requirements for site monitoring.

#### **1.4 STRUCTURE OF PLAN**

This Plan includes the following sections that outline the field program designed to meet these objectives:

- Building Selection Rationale
- Sampling Protocols
- Chemical Testing Program
- Decision Points and Contingencies Based on Sampling Data

Included with this Plan are several primary appendices. Appendix A is the Field Sampling and Analysis Plan which includes the standard operating procedures (SOPs) for collection of soil gas samples and indoor air sampling procedures. Appendix A describes all quality control procedures that will be implemented to meet the objectives stated above. Appendix B presents the analytical procedures to be employed by the USEPA on-site laboratory performing VOC testing using a modification of USEPA SW846 Method 8260. Appendix C presents the analytical procedures of the on-site laboratory that will screen samples following a modified USEPA SW846 8010/8020 procedure. Appendix D is the overall project Quality Assurance Project Plan. Appendix D outlines procedures and criteria that will be employed to document the quality of the data collected under this Plan. Appendix E describes the analytical requirements for all the off-site analyses conducted by the USEPA Region 9 laboratory and the private contract laboratory. Appendix E includes the client request forms (CRFs) for the analysis of VOCs using USEPA Method TO-15 and for the analysis of methane.

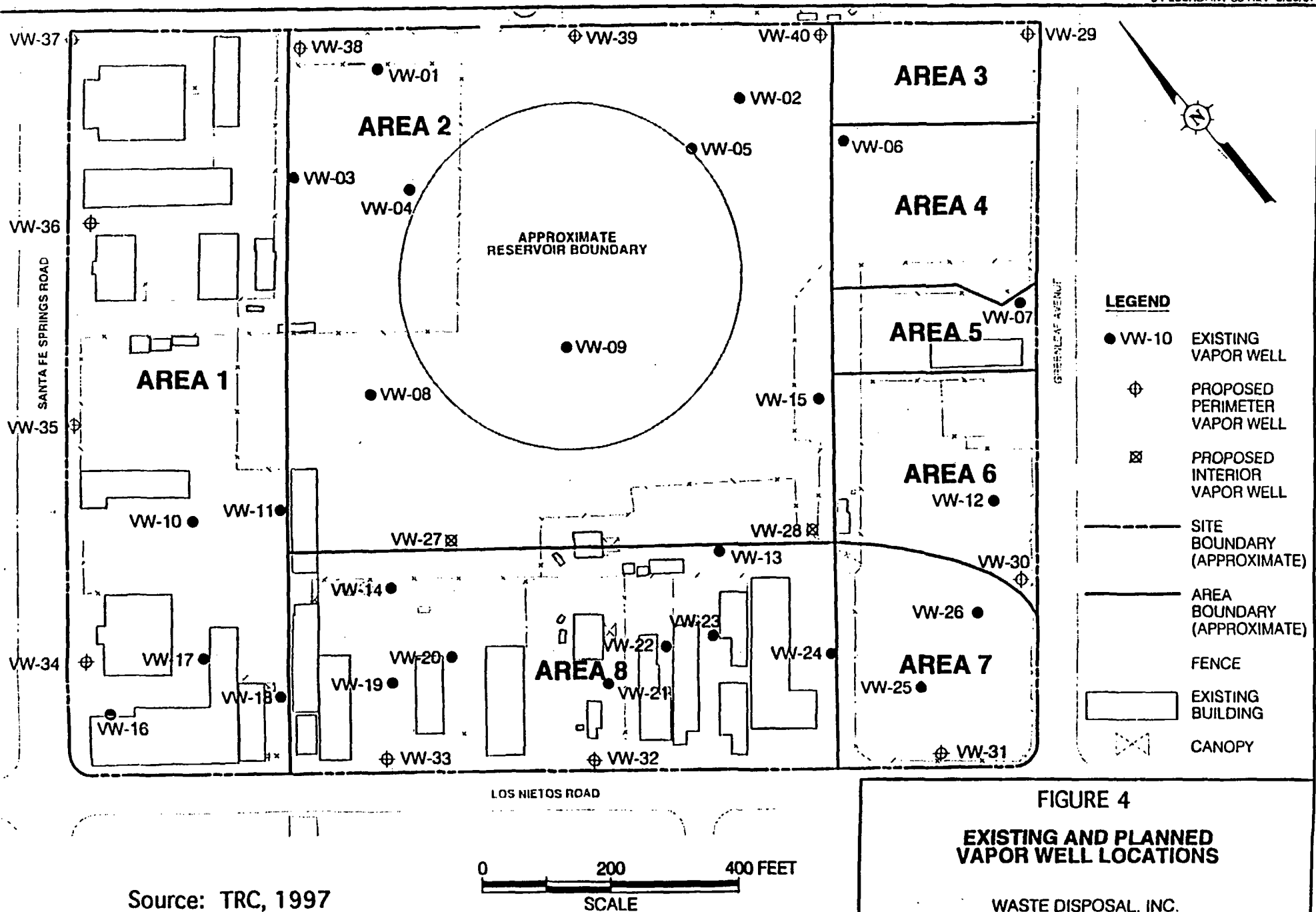
## 2.0 BUILDING SELECTION RATIONALE

At present, all buildings at the WDI site are targeted for indoor air sampling. All buildings are being targeted because (1) the data on subsurface gas distribution is primarily based on the 1989 RI which is now outdated, (2) the 1995 study was incomplete in coverage of the site and the results conflict in some areas with the 1989 data, (3) no information exists on how the buildings currently are being used (e.g., do some of the buildings have large bay doors that are open most of the time or are the doors of some buildings closed nearly all the time), and (4) there is no information on subsurface stratigraphy, soil fill placement activities, and utility trenches that could facilitate movement of site VOCs from a source location into a building. In addition, historical aerial photographs indicate that almost the entire area now covered by buildings was also used for liquid waste disposal in unlined, bermed areas (compare Figures 2 and 3). Based on the limited available information, there is no citation for eliminating any of the buildings for sampling at this time.

The available data on soil gas distribution will be used to focus sampling efforts to areas of the site with suspected elevated concentrations of chemicals and methane in the subsurface. The primary data base for subsurface gas distribution is from OVA, HNu, and explosive gas measurements taken during the drilling of approximately 105 soil borings throughout the site during the 1989 RI. Figure 4 indicates the borings and the distribution of vapor/gas measurements from the RI study. Figure 4 also indicates the location of the 14 new proposed vadose zone wells. Locations with historically high soil gas readings will be sampled first and the sampling program will be expanded from those locations to address the entire site.

Soil gas data from existing monitoring points and from temporary probes installed near buildings will be used to focus the indoor air monitoring program to buildings most likely threatened by subsurface soil gas migration. It is possible that after the new soil gas data are reviewed that some buildings may be eliminated from sampling because the data shows no site contaminants in the vicinity of the building. It is also possible that buildings used as warehouses or for auto repair with large open bay doors may also be eliminated from the indoor air sampling aspects of this Plan. Because the Los Angeles County Department of Health Services (LACDHS) in cooperation with the Santa Fe Springs Fire Department (SFSFD) monitors all buildings in the Santa Fe Springs area for methane gas (naturally occurring from adjacent oil well fields), all of the buildings will be at least sampled for methane buildup by either USEPA under this program or by LACDHS/SFSFD under the County's methane monitoring program. The subsurface gas investigation will still be implemented as outlined in this Plan so that the extent of subsurface gas migration can be defined in relation to occupied buildings and the boundary of the site.

A review of the list of tenants of the buildings at the WDI site (Table 1) indicates the potential for current chemical usage (e.g., auto repair, painting, metals manufacturing) and the presence of chemicals not detected in soil during the RI. The indoor air monitoring effort will need to ascertain chemical use in each building before monitoring efforts (chemical use could mask site chemicals in the indoor air) and take the new inventory of chemicals into account during



Source: TRC, 1997

0 200 400 FEET  
SCALE

**DRAFT**

REFERENCE: BASED ON FIGURES 2.3 AND 2.7, FINAL REMEDIAL INVESTIGATION REPORT, EBASCO, 1989d.



**TABLE 1**  
**BUILDING OWNERS AND TENANTS**  
**WASTE DISPOSAL, INC. SITE**  
**SANTA FE SPRINGS, CALIFORNIA**

Parcel No.	Parcel Owner	Address	Tenant
003	R.R. and D.H. Hobbrook Trust	12629 Los Nietos 12631 12635  12637	Unknown Metro Diesel Mold/Inject Stansell Brothers Molding and Machine Shop Techcoat Contractors
004	Dia-Log Company	9756 Santa Fe Spgs	Air Liquide
007	Eugene T. and Geraldine Welter Trust	9606 Santa Fe Spgs 9608 9610 9618 Suite 1, 2, 4, and 11 Suite 3 Suite 5 Suite 6 Suite 7 Suite 8 Suite 9 Suite 10 Suite 12 Suite 13 Suite 14 Suite 15 Suite 16	Cruz Electric Roland's Welding Lift Truck Converters  Arles Service Company Santa Fe Polishing Invicta Saw Unknown Winners Circle Elbee Printing EZ Glide/JM Enterprises Arch Mobil Hydraulic Vacant Kinghill Electrical Unknown Vacant KT Patterns
011	O.R.P Trust	Los Nietos	None; formerly Toxo Spray Dust
012	O.R.P Trust	12645 Los Nietos	Frontier Music
021	John L. Maples & Lucille F. Ferris Living Trust	9620 Santa Fe Spgs	Action Maintenance Co.
022	John L. Maples & Lucille F. Ferris Living Trust	9632 Santa Fe Spgs	E & L Electrical
024	P.R. and D.H. Holbrook Trust	12635 Los Nietos	Unknown
025	Pitts Family Trust and the Adelline R. Bennet, MD Trust	Interior	DDM Methods
026	Pitts Family Trust and the Adelline R. Bennet, MD Trust	Reservoir site	Santa Fe Springs Storage

**TABLE 1 (continued)**  
**BUILDING OWNERS AND TENANTS**  
**WASTE DISPOSAL, INC. SITE**  
**SANTA FE SPRINGS, CALIFORNIA**

Parcel No.	Parcel Owner	Address	Tenant
028	James J and Irene Mersits Trust	Santa Fe Spgs	Unknown
029	James J and Irene Mersits Trust	9640 Santa Fe Spgs	Mersits Equipment Rental
030	Pitts Family Trust and the Adelline R. Bennet, MD Trust	Santa Fe Spgs	None; property is an easement
032	David Joseph Neptune Family Trust	12747 Los Nietos	California Reamer Co.
037	Samuel A and Lula C. Graziano, and Jovilla I. Ortega	12801 Los Nietos 12803	Solomon's Press Repair Durango' Designs
041	Eugene T. and Geraldine Welter Trust	12807 Los Nietos 12807A 12807B 12809A 12809B 12811A 12811B 12811C 12811D 12811E 12811F	Unknown Four C's Transmission Rick's Smog Service Vacant Bert's Automotive Unknown Unknown Leo's Lawnmower Shop Hernandez Auto H&H Contractors H&H Contractors
042	Meade S. and Marjorie Peoples	12741 Los Nietos	Dan Ray
043	Eddie E. Timmons	12731 Los Nietos	Timmons Wood Products
044	Summitt Sheet Metal Inc. Employee Retirement Plan	12707 Los Nietos 12717 Los Nietos	D&H Laminating D&H Laminating
049	Gwen and Phil Campbell	Greenleaf	None
050	Brothers Machine and Tools	9843 Greenleaf	Brothers Machine and Tools
051	Pitts Family and the Adelline R. Bennet, MD Trust	Greenleaf	None

Tenant information provided by the Santa Fe Springs Fire Department.

Locations identified with a tenant as "unknown" were questionable in the Santa Fe Springs Fire Department records. All tenants will be verified by USEPA prior to implementation of this Subsurface Gas Contingency Plan

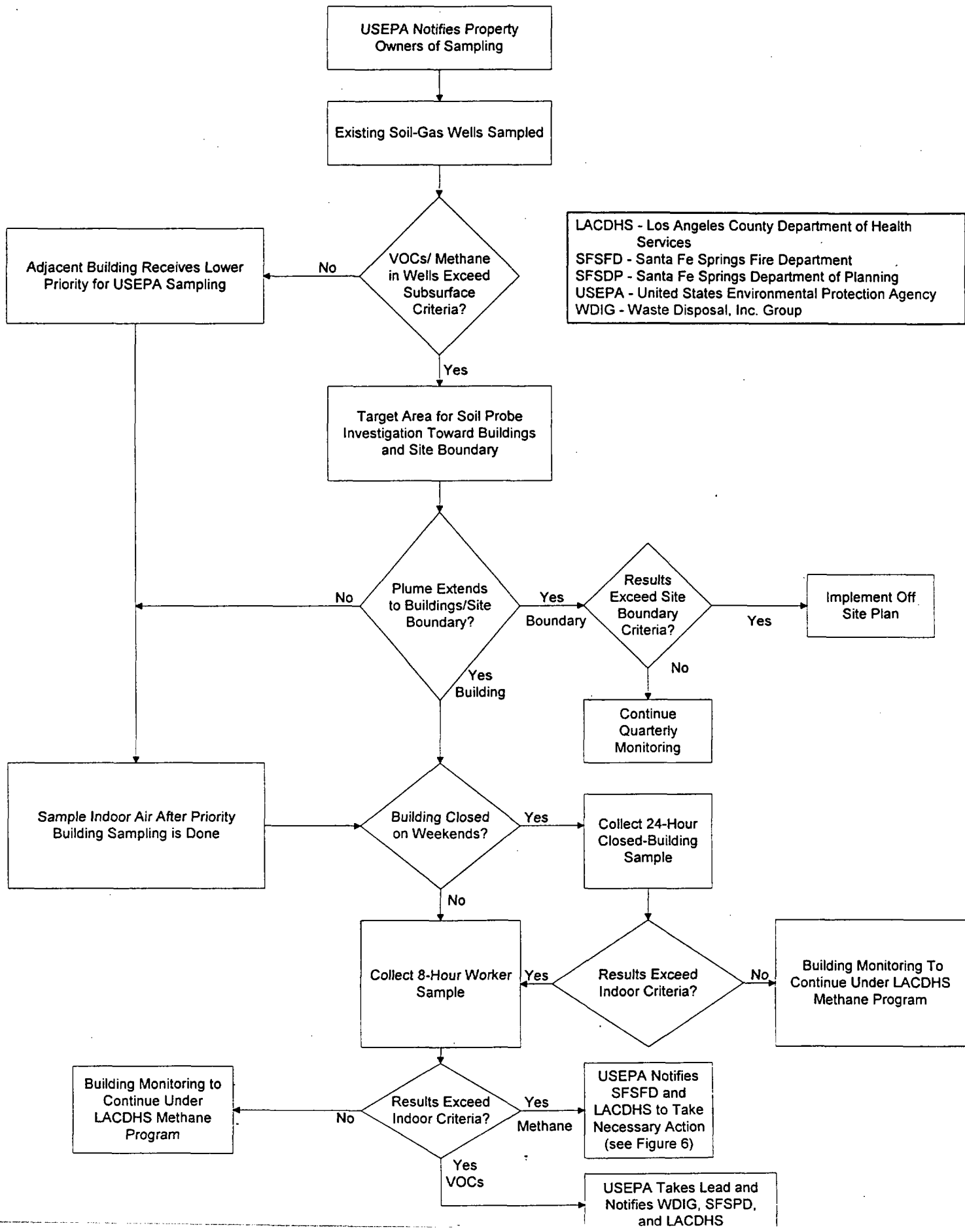
subsurface gas sampling efforts. To determine whether sources of VOCs inherent to a current business activity may contribute to indoor air concentrations, hazardous materials management plans or business plans (typically available from the local fire department) will be identified and reviewed for chemical usage for each building tenant. The review of business plans for chemical use determination is not a fail-safe means of ascertaining new chemicals that could show up in air sample results (or interfere with sample results). Tenants may have changed chemical products since the plans were filed, or tenants may have not filed a business plan believing that it was not necessary for their operations. The only accurate means of ascertaining chemical use within each of the buildings is through an on-site survey of each tenant's operations.

The available information on current tenants has conflicting information regarding building occupancy and the type of tenant. Prior to implementation of the sampling phases of this Subsurface Gas Contingency Plan, all locations will be visited to verify the presence of the tenant, the type of activity occurring within the premises, and to conduct a survey of current chemical usage.

To implement the program presented in this Subsurface Gas Contingency Plan, USEPA will first notify all property owners of the need to enter their properties/building and obtain access agreements from the owners to allow USEPA to conduct surveys and soil gas/indoor air monitoring. At the same time USEPA will notify the property owners of its intent to talk to the tenants directly. USEPA will then offer a planning meeting, to be attended by property owners and tenants, during which USEPA will explain the purposes of the monitoring efforts, the proposed activities that USEPA will implement, and a request for their cooperation so that business activities will receive minimal interference.

Figure 5 presents a flow diagram and decision tree for the implementation of activities in this Plan. Section 8.0 presents additional details on decision criteria and the steps taken if decision criteria are exceeded. Section 9.0 presents the project schedule which shows the interrelationships between the sampling activities.

**Figure 5**  
**Decision Tree for USEPA Subsurface and Indoor**  
**Monitoring, WDI Site**



### **3.0 SAMPLING PROTOCOLS - EXTERIOR SUBSURFACE GAS**

#### **3.1 EXISTING SOIL GAS MONITORING WELLS**

The first sampling activity at the WDI site will be the sampling of all accessible and serviceable soil gas (vadose zone) wells. A total of 26 vadose zone wells were installed in 1989 at the site (Figure 4). A total of 23 of these wells were accessible/serviceable in 1995. An attempt will be made to locate all 26 wells for sampling as part of this program and all intact and serviceable wells will be sampled. At present, there are no plans to replace non-accessible/non-serviceable wells. Based on the results of the existing gas well sampling and the soil gas probe samples, the need for replacement wells will be evaluated. The PRPs are required to install point of compliance wells near buildings at the site boundary. It is possible after the new data are reviewed that some of the serviceable wells will be replaced. Otherwise any new soil gas wells installed at the site will be placed to define site compliance or soil gas remedy demonstration issues. USEPA will review and approve all PRP plans for installation of new soil gas wells. All serviceable wells will be resampled and new wells installed by the PRPs will be sampled at the end of this field program.

All samples collected will be analyzed in the USEPA Region 9 Field Analytical Support (FASP) mobile laboratory based on a modification of SW846 Method 8260. It is assumed that the on-site laboratory will analyze 10 samples per day (including duplicates but excluding QC samples) and it will take 4 days to complete the sampling of the existing soil gas wells. At vadose zone well locations near buildings that have historically high gas readings, a SUMMA canister sample will be collected for confirmation of the on-site laboratory results through analysis or in a private contract laboratory qualified to perform TO-15 analyses. Four confirmation samples are planned for collection.

#### **3.2 SOIL GAS PROBE SAMPLING**

As data become available from the sampling of the existing vadose zone wells, areas of the site will be targeted for definition of the extent of soil gas migration in the direction of buildings and the site boundary. A geoprobe rig will be used to drive a soil gas sampling tube approximately 10 ft below ground surface (bgs) for the purpose of collection of a subsurface gas sample. All initial temporary probe samples will be collected at 10 ft bgs because at that depth there is minimal chance for influence from ambient air. If no VOCs are detected at 10 ft bgs, then additional samples will be collected at 20 ft and 30 ft bgs to verify no VOC in soil gas at that location. Deeper samples will also be collected at the suspected waste disposal sites outside of the reservoir (see Figure 3) to determine if wastes remain at depth. The samples will be analyzed in a second onsite mobile laboratory for VOCs based on modified USEPA SW846 methods 8010/8020. Gas probe sampling will initiate two days after results from the vadose wells become available. Gas probe installation and sampling will continue until all areas of the site have been characterized as to extent of subsurface gas migration. This activity is expected to last

two weeks. The second laboratory will analyze up to 16 samples per day (including duplicates and quality control samples). Results from the second screening laboratory taken at critical locations (e.g., adjacent to buildings) or anomalous results will be confirmed through duplicate analyses in the Region 9 mobile laboratory. Approximately five soil probe samples will be collected in SUMMA canisters for analysis in a private contract laboratory qualified to use method TO-15. Approximately 20 samples will be analyzed in the offsite laboratory for methane content.

### **3.3 METHANE ANALYSIS**

Because the WDI site is being closed as a landfill and because exposure levels of "methane" have been reported for the site, selected samples from gas wells, ambient air and soil probes will be analyzed for methane content. These analyses will serve two primary purposes. First, the total gas composition analysis will provide an indication of the contribution of methane versus other flammable gases in the site monitoring instrument readings (site instruments will not be able to differentiate methane from other VOCs). Second, an understanding of the rate of methane production will be important for the design and operation of the planned soil vapor extraction system. Although concentration of most VOCs will decrease over time, there may be sufficient organic matter beneath the site that will cause methane production of methane over an extended period of time. Knowledge of methane production rates is critical for the remedy systems.

#### **4.0 INDOOR METHANE SAMPLING BY LACDHS**

Independent of USEPA's exterior subsurface gas sampling activities described in Section 3.0 and USEPA's indoor air sampling described in Section 5.0, the Los Angeles County Department of Health Services (LACDHS) will be conducting inspections of the on-site buildings to sample for the presence of methane in the indoor air. Based on State and County agency interpretation of California Code of Regulations (CCR) Title 14 and historical evidence that solid waste materials were disposed of at the site, the entire WDI site (occupying 43 acres bounded by Santa Fe Springs Road, Los Nietos Avenue, Greenleaf Avenue, and St. Paul's School) is defined as a landfill. Section 17783.0 of Title 14 states that methane in landfill gas must not exceed 25% of the lower explosive limit (LEL) (e.g., 1.25% of methane per volume in air) in structures located on landfills. Under Section 17783.11, monitoring is required, at a minimum, on a quarterly basis and the results are to be submitted to LACDHS and the California Integrated Waste Management Board (CIWMB). LACDHS is the lead local enforcement agency for the State of California for these Title 14 requirements. After completion of the field activities being conducted during the summer of 1997 by USEPA and the WDIG, LACDHS will evaluate the new data for the site and determine if individual parcels will be required to be monitored quarterly to comply with CCR Title 14 Sections 17783.11 and 17783.12.

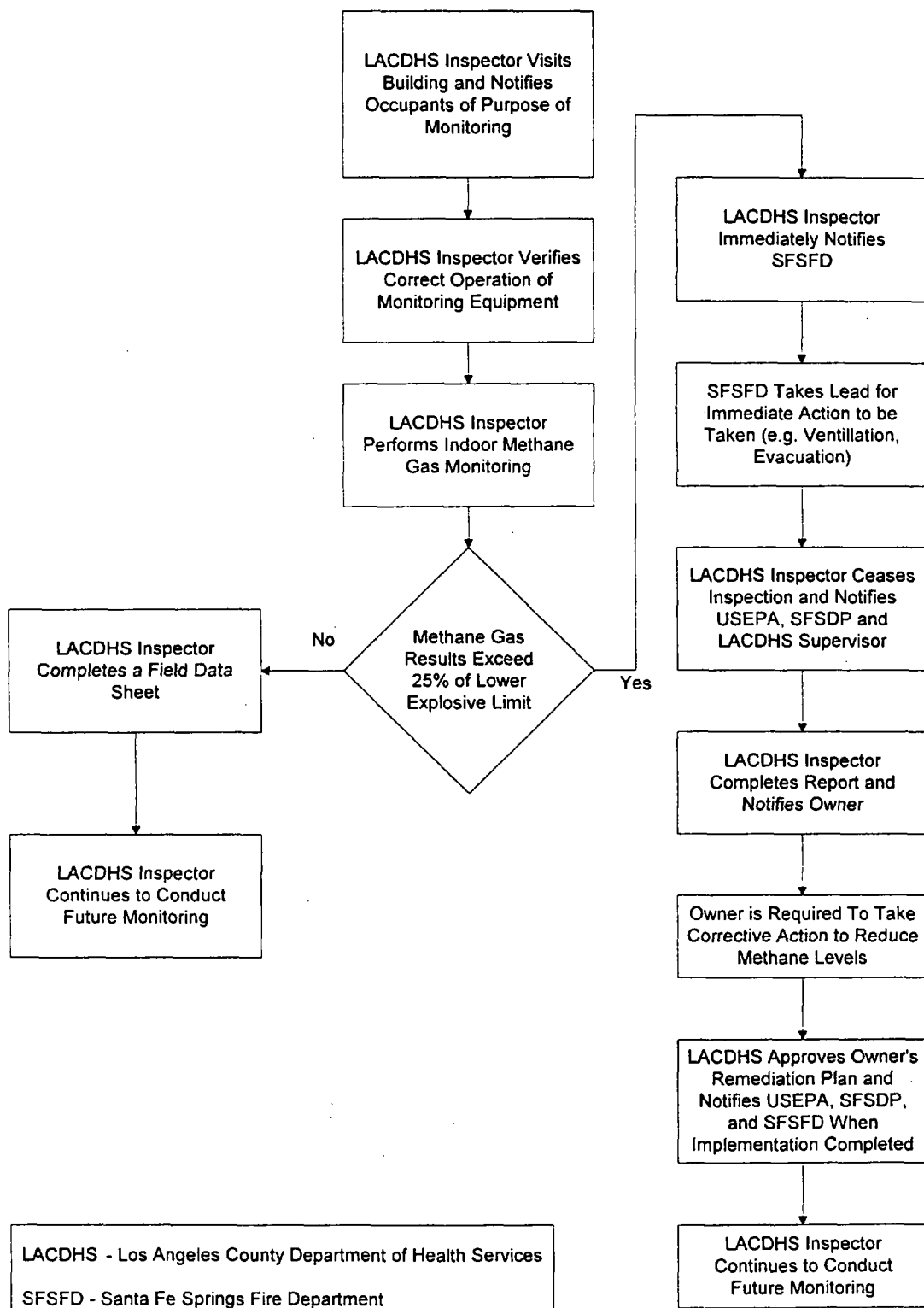
#### **4.1 METHANE SAMPLING PROCEDURES**

The LACDHS will use its own gas detection equipment and follow its own agency monitoring procedures, not the methane sampling procedures used by the USEPA. Based on an independent sampling schedule, one or more LACDHS inspectors will visit the businesses located on the site. The LACDHS inspector will provide identification to the occupants of the business and explain that LACDHS will be conducting an indoor air methane survey to ensure that methane from subsurface gases has not migrated into the building at levels that exceed 25% of the LEL. Before commencing any methane survey activities, LACDHS inspector will check to see that gas detection equipment is operational and actively sampling ambient air outside the building. Figure 6 presents a flow diagram illustrating the LACDHS sampling and decision process.

To conduct this sampling, LACDHS inspector will use two types of portable methane detection instruments: flame ionization detection (FID)/Organic Vapor Analyzer (OVA) and a combustible gas indicator (CGI)/thermal conductivity detector. The monitoring instruments will be calibrated prior to and at the conclusion of a day's monitoring, in accordance with the manufacturer's recommended calibration frequency.

Prior to entering any confined spaces within the building or any exterior on-site closed structures, the inspector will place the detection hose or nozzle into the interior environment so that the detection equipment precedes the inspector when entering the confined space or structure. The inspector will ensure that no ignition sources (e.g., electrical equipment sparks from turning on lights, smoking, friction ignition sources from metal strikes) are present at the time the methane monitoring is being conducted.

**Figure 6**  
**Decision Tree for LACDHS Monitoring of Indoor Air**  
**WDI Site**



LACDHS - Los Angeles County Department of Health Services  
 SFSFD - Santa Fe Springs Fire Department  
 SFSPD - Santa Fe Springs Department of Planning  
 USEPA - United States Environmental Protection Agency  
 WDI - Waste Disposal, Inc.



Readings of the gas levels inside the building or structure will be taken before the inspector fully enters the interior space. If the detection equipment indicates that the methane levels are below 25% of the LEL, the inspector will continue to monitor interior locations within the building or structure which are most likely to emit or accumulate methane gas (e.g., cracks and crevices, closed cupboards and closets, under sinks, near plumbing outlets). A "Gas Monitoring Record" will be completed for each monitoring inspection for each on-site building or structure. If a building or structure has been sub-divided into separate businesses or contained spaces, each separate business or space will be monitored. The field data sheet will contain the following information: landfill (site) name, monitoring date and time, weather data including precipitation and wind information, inspector's name, instrument type and identification number, instrument calibration dates, location of structure(s) monitored, and inspector's comments.

#### **4.2 NOTIFICATION PROCEDURES IF METHANE LEVELS EXCEED 25% OF LEL**

If levels of methane are detected less than 25% of the LEL, continued unannounced monitoring will be conducted by LACDHS to validate data. LACDHS will provide the "Gas Monitoring Record" to USEPA, Santa Fe Springs Fire Department (SFSFD), and Santa Fe Springs Department of Planning and Development (SFSDPD).

If levels of methane are detected which exceed 25% of the LEL, the LACDHS inspector will terminate the monitoring, vacate the building immediately, and notify the SFSFD. The inspector will also notify by telephone the LACDHS supervisor, USEPA, and the SFSDPD. In accordance with Figure 6, emergency response procedures to ventilate the building will be taken, as necessary, to protect the public health and safety. Upon notification, the SFSFD will provide assistance to the LACDHS if any evacuation or immediate ventilation emergency measures are needed. The list of contacts and phone numbers for emergency notification are included in Table 2.

If methane levels exceed 25% of the LEL, the LACDHS inspector will complete a "Closed Facility Report" and "Gas Monitoring Record" indicating the specific violations that were observed and direct the business or property owner to take effective, permanent measures to abate the methane gas problem. The LACDHS, in coordination with the Los Angeles County Department of Public Works, will have lead responsibility for enforcing and overseeing the submittal by the owner of the property of a remediation plan to permanently reduce the levels of methane within the building or structure. Upon LACDHS's approval of the remediation plan, the property owner will implement the remediation action. Once the property owner has completed the remediation to LACDHS's satisfaction, LACDHS will notify the USEPA, SFSDPD, and SFSFD.

Figure 6 summarizes the sampling activities, decision criteria, and actions taken by the LACDHS in its methane monitoring surveys of WDI site structures.

**TABLE 2**  
**AGENCY CONTACTS**  
**WDI SITE, SANTA FE SPRINGS, CALIFORNIA**

<b>Agency</b>	<b>Contact Name</b>	<b>Phone Number</b>
CIWMB	Darryl Petker	916-255-3836
LACDHS	Virginia Maloles Supervising Environmental Health Specialist	213-881-4151
SFSFD	Fred Nikitin Fire Marshall	562-868-0511 x 215
SFSDPD	Robert Orpin Director	562-868-0511 x 211
SFSDPD	Andy Lazzaretto Redevelopment Consultant	562-868-0511 x 291
USEPA	Andria Benner Superfund Project Manager	415-744-2361
USEPA	Carmen White Community Involvement Coordinator	415-744-2183

CIWMB - California Integrated Waste Management Board

LACDHS - Los Angeles County Department of Health Services

SFSFD - Santa Fe Springs Fire Department

SFSDPD - Santa Fe Springs Department of Planning and Development

USEPA - United States Environmental Protection Agency

## **5.0 INDOOR AIR SAMPLING PROTOCOLS FOR VOCs AND METHANE - USEPA SAMPLING**

Sampling of indoor air for WDI chemicals of concern (COCs) will be performed in a phased process. The first step will be the planning meeting to be attended by property owners (scheduled for June 24, 1997). The building owners will be provided with a general information packet describing the objectives of the sampling program and the activities USEPA proposes to implement. Next, business plans previously obtained from the SFSFD will be reviewed for chemical usage by the tenants. Prior to any visits of any buildings, USEPA will ascertain the key contact for each tenant to schedule the walkthrough.

Because open containers of solvents, paints, or other VOCs can greatly influence sampling results, masking or interfering with the detection of site COCs, care will be taken in locating sampling points and sampling within buildings currently using volatile chemicals. Indoor air sampling for VOCs may not be possible for some buildings with significant active chemical use. Two types of indoor sampling events will occur. The first will be a "worst-case" closed building sample collected over the weekend. Closed building sampling will not be possible for those buildings that have activity (e.g., sales, auto repair, manufacturing) during the weekend. The second event will be a workday sampling event when workers are present. These two events are described below.

### **5.1 INDOOR AIR SAMPLING: 24-HOUR CLOSED BUILDING EVENT**

The results of the vadose zone monitoring well and temporary probe gas samples obtained as described in Section 3.0 will be used to initially target buildings for indoor air sampling. After a review of the soil gas data and tenant operations, each building tenant manager will be notified of the need for indoor air monitoring. If the building is closed over the weekend, the first indoor sampling will reflect a "worst-case" closed building sampling event. This will involve collection of a 24-hour integrated sample, typically from 8 AM Sunday through 8 AM Monday.

To conduct this sampling, the building will be visited the morning of the sampling to interview the tenant manager, conduct a walkthrough, ascertain chemical usage, identify potential locations for indoor air sampling, and to obtain initial indoor air readings using portable instruments to perform a "crack and crevice" survey. A photoionization detector (PID) and combustible gas indicator (GCI) monitor will be used. The PID will quantify total organic vapors, if present, to a detection limit of 1 part per million per volume (ppmv). The gas detector will quantify total gas as methane both in ppmv and in the percentage of the lower explosive limit (LEL). If PID or gas monitor readings indicate the presence of a potential site COC within the building, then that location will be targeted as an indoor sampling point. If no VOCs or methane are detected by the instruments, then a common worker area will be targeted for subsequent indoor air sampling. The SUMMA canister will be set at the identified sampling location and then allowed to collect the 24-hour sample.

SUMMA canister samples will be analyzed either in the Region 9 laboratory in Richmond, California or in a private contractor laboratory depending on number of samples collected and the weekly capacity of the USEPA laboratory. SUMMA canister samples will be analyzed for VOCs using USEPA Method TO-15. If the gas detector detects more than 1% methane in the building, SUMMA canister samples will also be analyzed for methane. Turn-around-time will be 7 days.

## **5.2 INDOOR AIR SAMPLING: 8-HOUR OPEN BUILDING EVENT**

Results from the closed building samples will be reviewed for the presence of subsurface gas VOCs. If no detections of site VOCs and methane are found in the "closed" building sample, then the building will be turned over to LACDHS/SFSFD for methane monitoring. If detections of VOCs and/or methane are found, then the building will be targeted for a mid-week sampling episode. The mid-week sampling will involve collection of a 8-hour integrated sample in a SUMMA canister for off-site analysis for VOCs and methane. This sample will be analyzed in the Region 9 laboratory or in a private contractor laboratory depending on the number of samples collected and the weekly capacity of the USEPA laboratory. SUMMA canister samples will be analyzed for VOCs using USEPA Method TO-15. If the gas detector detects more than 1% methane in the building, SUMMA canister samples will be analyzed for methane. If VOCs or methane are detected in this sample, then additional sampling may be performed as outlined in Section 8.0.

## **6.0 USEPA SAMPLING AND MONITORING DEVICES**

### **6.1 INSTRUMENTS**

An HNu Model PI 101 (or equivalent) organic vapor detector will be used as the hand held instrument to monitor for detectable non-methane VOCs (based on the ionization potential of the photoionization source) at a detection limit of 1 ppmv. The instrument will be calibrated using isobutylene. Procedures for instrument operation, calibration, and maintenance are presented in Appendix A.

A Gastector Hydrocarbon Surveyor (or equivalent) will be used to monitor for explosive gases (methane) at a detection limit of 1 ppmv and 1% LEL. This instrument will also have the capability of reading oxygen levels during purging of soil gas wells. The instrument will be calibrated using a methane standard. Procedures for instrument operation, calibration, and maintenance are presented in Appendix A.

A vacuum pump will be used to purge existing (and new if installed) soil gas wells prior to sampling. Actual samples will be collected in either an air-tight, glass syringe, or within a tedlar sampling bag. The glass syringe will have "T"-mounted dual injection ports, each fitted with gas-tight stopcocks. This will allow purging of the syringe while it is fixed in an air-tight fashion to the sampling point of the soil gas well or the temporary soil gas probe. SUMMA canisters will be used to collect confirmation samples for analysis in the USEPA Region 9 laboratory in Richmond, California.

The operation of the SUMMA canister is described in Appendix A. The number of SUMMA canisters to be employed in this study is dependent on the outcome of building surveys/walkthroughs and the results of the subsurface gas sample results indicating a potential problem with a building location.

### **6.2 AMBIENT AIR SAMPLING**

Ambient air samples will be collected during all sampling activities to provide background data on concentrations of VOCs and methane in ambient air at the site. Ambient air samples will be collected in SUMMA canisters and analyzed at an off-site laboratory using USEPA method TO-15. If more than 1% methane is detected in a building with a field instrument, samples will also be analyzed for methane at an off-site laboratory. Samples of ambient air will be collected from upwind from the site. A temporary weather station will be established to provide wind direction data for the period of ambient air sampling.

### **6.3 ON-SITE MOBILE LABORATORIES**

Two on-site mobile laboratories will be used to analyze gas monitoring well and temporary soil gas probe samples. The first laboratory will be equipped with a gas chromatograph/mass

spectrometer (GC/MS) and will be capable of producing definitive analytical data using a modification of USEPA SW846 Method 8260. This laboratory will be capable of analyzing 12 soil gas samples per 8-hour work day. The second on-site laboratory will be a screening laboratory equipped with a GC unit only. This laboratory will be set up to provide quick turn-around results and report only key COCs. The laboratory will process up to 20 samples per 8-hour work day and will be used to direct the installation of soil gas probes for defining the soil gas plume. Results from the second on-site laboratory will also be used for identifying locations where definitive analytical data are necessary (i.e., confirmation analyses performed through either the on-site Region 9 laboratory or off-site laboratory in Richmond).

Appendix B presents the analytical protocols to be followed by the on-site Region 9 mobile laboratory while Appendix C presents the analytical protocols to be followed by the screening laboratory.

#### **6.4 STANDARD OPERATING PROCEDURES**

Appendix A is the Field Sampling Plan that includes all field sampling procedures of gas collection, survey instrument use, and handling/shipment of SUMMA canisters.

All SUMMA canisters will remain sealed and unopened before their use. The vacuum level of the SUMMA canister will be verified to be within project specifications before use. All SUMMA canisters with a vacuum below project specifications will be returned to the laboratory unused.

The glass, air-tight syringes used to purge temporary soil gas probes and collect samples from gas wells and points, will initially be purged using laboratory grade (analyte free) nitrogen and then decontaminated before use by disassembly and placing of all parts in a 100°C oven. Following decontamination, the syringe will be reassembled, purged again with nitrogen, and then stop cocks closed until use. During sampling at each well head/temporary probe, the syringe will be purged at least three times using air from the well/probe before the actual sample is drawn.

A vacuum pump will be used to purge standing air from within the gas monitoring wells. At least two casing volumes of air will be removed before the sample is collected. During purging, measurements will be recorded of the methane, carbon dioxide, oxygen, and VOCs (PID reading) in soil gas.

Sample locations will be identified as described in the Field Sampling Plan (Appendix A). Sampling activities will be recorded in a field log book and on a Field Data Sheet. The beginning and ending times of each sample collection event will be recorded along with pertinent sampling information (e.g., purge volume, PID readings, etc.). Glass syringes or Tedlar bags containing gas samples will be immediately placed into a cooler for transport to the appropriate on-site laboratory. SUMMA canisters will be shipped directly to the off-site laboratory

following sample collection. The SUMMA sample will be analyzed using USEPA Method TO-15.

SUMMA canister field blank samples will be processed during the sampling event. The field blanks will be handled, transported, and exposed to all conditions as the soil gas samples collected from wells, probes, or indoor air, but the blank canisters will not be opened. These blanks will aid in determining whether detections of COCs in primary samples could be the result of laboratory preparation, canister shipment, or handling in the field.

A chain-of-custody form will be completed for all samples shipped to the offsite laboratory and for all samples transferred to the on-site laboratories. Appendix B includes the procedures for completing the form. A copy of the Field Data Sheet will accompany all samples provided to the on-site laboratories. In addition to the sample identifier, the Field Data Sheet will also contain approximate contaminant concentrations determined during purging that will assist the on-site chemist in performing the analyses. The Field Data Sheet will be cosigned by the sampler and chemist when the sample is introduced to the laboratory.

Appendix F presents the Health and Safety procedures to be employed as part of this project.

## **7.0 CHEMICAL TESTING PROGRAM**

### **7.1 ANALYTES**

Table 3 presents the list of chemicals and their detection limits typically reported using USEPA Method TO-15. This table represents a "master list" of VOCs that the off-site laboratory can report and not necessarily the COCs for the WDI site. However, given that chemical use is suspected for several buildings at the site and there is a potential for new volatile chemicals to be present in the soil gas, the entire TO-15 VOCs list will be requested for the off-site laboratory analyses. In addition, all laboratories will be required to report tentatively identified compounds (TICs). The FASP, Region 9 Richmond Laboratory and private contractor laboratory will be required to quantify the presence of a TIC so that a follow-up analysis can be performed either in the FASP or private contract laboratory.

Table 4 presents the WDI site COC list based on the results of the 1989 RI and the 1995 WDIG sampling events. Included in the table is the maximum concentration of the VOCs reported for both studies. These chemicals will be the initial target chemicals for the on-site laboratory analyses. The list of COCs may be expanded if new chemicals are detected during the soil gas or indoor air sample analyses. The primary concern for expanding the COC list is the identification of any new VOCs that could impair or prolong operations of the proposed soil vapor extraction remedy, currently in design stages.

Some buildings may have specific analyte lists that differ from other buildings based on the types of chemicals currently being used in the building. These chemicals may not become a new COC for the WDI site, assuming they are not being detected in soil gas, but the chemicals may become compounds of interest for checking air quality results for the particular building. The COC list will be expanded only if the chemical is detected in soil gas and has the potential of entering the proposed soil vapor extraction (SVE) remedial action system.

### **7.2 ANALYTICAL METHODS**

SUMMA canister samples will be analyzed in the USEPA Region 9 laboratory using GC/MS procedures based on USEPA Method TO-15. One of the on-site laboratories will also base its analyses on USEPA SW846 Method 8260, while the screening laboratory will use a modified USEPA Method 8010/8020 to perform the analyses. The USEPA onsite laboratory, Region 9 laboratory and private contract laboratory will produce definitive level data with complete data packages. Data will be validated at a frequency of 20 percent. The screening laboratory will produce screening level data confirmed through definitive level confirmation samples analyzed by the USEPA on-site laboratory samples. The appendices present the analytical methods. Limits of detection for the TO-15 analyses are presented in Table 3, while limits of detection for the screening laboratory are presented in Table 5.



**TABLE 3**  
**VOLATILE ORGANIC COMPOUNDS**  
**REPORTED BY USEPA METHOD TO-15**

COMPOUND	Region IX CRQL (ppbv)	Contract Lab CRQL (ppbv)	COMPOUND	CRQL (ppbv)	Contract Lab CRQL (ppbv)
Freon 12	1.0	1.0	1,2-Dichloropropane	1.0	0.2
Freon 114	1.0	1.0	cis-1,3-Dichloropropene	1.0	0.2
Chloromethane	1.0	0.4	Toluene	1.0	0.2
Vinyl Chloride	1.0	0.2	trans-1,3-Dichloropropene	1.0	0.2
Bromomethane	1.0	1.0	1,1,2-Trichloroethane	1.0	0.2
Chloroethane	1.0	1.0	Tetrachloroethene	1.0	0.2
Freon 11	1.0	1.0	1,2-Dibromoethane	1.0	0.2
1,1-Dichloroethene	1.0	0.2	Chlorobenzene	1.0	0.2
Freon 113	1.0	1.0	Ethylbenzene	1.0	1.0
Methylene Chloride	1.0	0.2	m,p-Xylenes	2.0	2.0
1,1-Dichloroethane	1.0	0.2	o-Xylene	1.0	1.0
cis-1,2-Dichloroethene	1.0	0.2	Styrene	1.0	1.0
Chloroform	1.0	0.2	1,1,2,2-Tetrachloroethane	1.0	0.2
1,1,1-Trichloroethane	1.0	0.2	1,3,5-Trimethylbenzene	1.0	1.0
Carbon Tetrachloride	1.0	0.2	1,2,4-Trimethylbenzene	1.0	1.0
Benzene	1.0	0.2	1,3-Dichlorobenzene	1.0	0.2
1,2-Dichloroethane	1.0	0.2	1,4-Dichlorobenzene	1.0	0.2
Trichloroethene	1.0	0.2	1,2-Dichlorobenzene	1.0	0.2

CRQL = Contract Required Quantitation Limit

In addition to reporting all of these analytes, the laboratories will also report tentatively identified compounds (TICs).

**TABLE 4**  
**VOCs CHEMICALS OF CONCERN**  
**FOR WDI SITE**

Compound	Maximum Concentration Reported 1989 USEPA RI (ppbv)	Maximum Concentration Reported 1995 WDIG RI (ppbv)
Acetone	NR	13
Benzene	16,000	2,000
Carbon Tetrachloride	1.5	NR
Chloromethane	NR	71
Chloroform	24	NR
Dibromoethane	63	77
Dichloroethane	29	NR
cis-1,2-dichloroethene	3.7	7.1
1,1-Dichloroethane	NR	190
1,2-Dichloropropane	NR	360
trans-1,2-dichloroethene	NR	1.6
Ethylbenzene	NR	2,100
Tetrachloroethene (Perc)	60	42
Trichloroethane	1,150	NR
Trichloroethene	3,000	34
Toluene	NR	110
Vinyl Chloride	12,00	790
m,p-Xylene	NR	5,500
o-Xylene	NR	200
Methane	6.48%	9.34%

Note: These compounds reflect all chemicals reported. The chemicals reported may not reflect all chemicals detected during the RIs. They are COCs because they can be used as tracers to identify the soil gas plume and not necessarily due to risk.  
NR = not reported

**TABLE 5**  
**VOLATILE ORGANIC COMPOUNDS IN AIR**  
**TO BE ANALYZED BY ON-SITE FASP LABORATORY**  
**BASED ON USEPA METHOD 8260 AND SCREENING LABORATORY**  
**BASED ON USEPA METHODS 8010/8020**

COMPOUND	CRQL (ppbv)	MDL (ppbv)
Vinyl Chloride	360	54
1,1-Dichloroethene	230	18
1,1-Dichloroethane	230	14
cis-1,2-Dichloroethene	230	9
trans-1,2-Dichloroethene	230	9
Chloroform	190	22
1,1,1-Trichloroethane	170	30
Carbon Tetrachloride	150	30
Benzene	290	92
Trichloroethene	170	26
Toluene	240	16
Ethylbenzene	210	19
1,1,2-Trichloroethane	170	10.0
Tetrachloroethene	170	10.0
m,p-Xylene	420	10.0
o-Xylene	210	22
Acetone	350	100
Methyl Ethyl Ketone	350	100

CRQL = contract-required quantitation limit

MDL = method detection limit

## 8.0 OVERALL SAMPLING APPROACH, DECISION POINTS, AND CONTINGENCIES

In the event that site COCs are detected in indoor air, soil gas adjacent to the building, or soil gas at the site boundary, specific steps will be taken to evaluate the situation and to implement additional activities that are necessary to protect human health (Table 6). The steps that will be taken are described in the following text. Action (threshold) criteria are presented in Tables 7 and 8. Indoor air and adjacent building soil gas criteria are based on USEPA ambient air preliminary remediation goals (PRGs). OSHA permissible exposure levels (PELs) are not being applied because the indoor workers do not specifically meet the OSHA criteria for chemical exposure (i.e., OSHA PELs are established for workers knowingly exposed to chemicals as part of their normal work activities; workers occupying buildings at the WDI site may be exposed to site chemicals, unrelated to their work activities). USEPA ambient air PRGs are also being used as the basis for evaluating soil gas COC concentrations at the site boundary. Because benzene and vinyl chloride are known human carcinogens and thus are considered to be the more toxic of the site COCs, separate criteria have been developed for these two chemicals (Table 8).

The following text summarizes the subsurface gas contingency sampling program and presents the points in the process where decisions are required so that project objectives can be met.

1. USEPA provides notification letters to property owners of the pending subsurface gas/indoor air monitoring activities and invites property owners with their tenants to participate in a planning meeting to be held near the site.
2. USEPA obtains business plans from the local fire department to ascertain current chemical use in the WDI site buildings.
3. USEPA schedules a meeting (June 24, 1997) with each building owner to describe the sampling activities in and around the buildings.
4. USEPA mobilizes Region 9 field (FASP) laboratory and initiates sampling of the existing vadose zone monitoring wells.
5. USEPA mobilizes second field (screening) laboratory and geoprobe rig to collect temporary soil gas probe samples. The target depth for each probe will be 10 ft below ground surface, but depth may vary based on the specific site lithology of the location.
6. USEPA completes first round of sampling of existing vadose zone monitoring wells using an on-site laboratory to perform the primary analyses with an off-site laboratory performing confirmation analyses. The objective of the sampling is to confirm current COCs and their concentrations.

**TABLE 6**  
**GENERIC THRESHOLD CRITERIA TO BE APPLIED TO ALL SAMPLING**  
**SCENARIOS**

Threshold Criteria	Action
VOCs and methane not detected in soil gas or in building air, or detections are less than 10% of threshold values.	Building receives low priority for indoor sampling. Soil gas is sampled quarterly. LACDHS/SFSFD to continue indoor methane monitoring/inspections.
Concentration of Analyte is less than 50% of the Threshold for Soil Gas, Indoor Air, or Site Boundary (Table 7)	Building receives moderate priority for indoor sampling. Monitoring Program is implemented as specified herein (i.e., quarterly sampling of well network and affected building); evaluate effectiveness of soil gas remedy. No other actions recommended.
Concentration of Analyte Exceeds 100% of Threshold	Building receives high priority for sampling. Resample affected area immediately. Reevaluate positioning of SVE wells. If exceedence is in soil gas, expand sampling effort in adjacent building(s). If indoor, inform property owner/tenants of findings. Inform LACDHS and SFSFD of findings. Indoor corrective measures may be warranted such as improving building ventilation. If exceedence is at site boundary, develop program for offsite monitoring. Develop community relations program.

**TABLE 7**  
**SOIL GAS AND INDOOR AIR THRESHOLD SCREENING LEVELS**  
**FOR WDI SITE CHEMICALS OF CONCERN**

Compound	Soil Gas Threshold Value (ppbv)	Indoor Air Threshold Value (ppbv)	Site Boundary Threshold Value (ppbv)
Acetone	31,200	312	15,600
Benzene	See Table 8	See Table 8	190
Carbon Tetrachloride	68	0.68	34
Chloroethane	75,200	752	37,600
Chloroform	340	3.4	170
Dibromoethane	6	0.06	34
Dichloroethane	360	3.6	180
cis-1,2-dichloroethene	1,860	18.6	930
1,1-Dichloroethane	25,600	256	12,800
1,2-Dichloropropane	186	1.86	93
trans-1,2-dichloroethene	3,680	36.8	1,840
Ethylbenzene	49,000	490	24,500
Tetrachloroethene (Perc)	1,064	10.6	532
Toluene	21,200	212	10,600
Trichlorethane	440	4.4	220
1,1,1-Trichloroethane	36,800	368	18,400
Trichloroethene	822	8.2	411
Vinyl Chloride	See Table 8	See Table 8	0.85
m,p-Xylenes	14,280	142.8	16,800
o-Xylene	14,280	142.8	16,800
Methane	5%	1.25%	1.25%

**TABLE 8**  
**THRESHOLD LEVELS FOR BENZENE AND VINYL CHLORIDE**  
**SOIL GAS AND INDOOR AIR<sup>1</sup>**

Analyte	Measure Soil Gas Level (ppbv)	Estimated <sup>2</sup> Indoor Air Level (ppbv)	Recommended Response Action	Response Comment
Benzene Vinyl Chloride	<200 <25	<2 <0.25	No action. Continue monitoring on a quarterly basis until USEPA agrees that characterization is sufficient	Negligible Risk
Benzene Vinyl Chloride	200-2,000 25-250	2-20 0.25-2.5	No immediate action. Continue monitoring on a quarterly basis. More frequent indoor air sampling may be taken at USEPA's discretion.	Low Increased Risk. Potential lifetime excess cancer risks arising from a 25-year exposure for adults are $\leq 1 \times 10^{-5}$ to $1 \times 10^{-4}$ which are at the upper end of the Superfund target risk range.
Benzene Vinyl Chloride	2,000-10,000 250-5,000	20-100 2.5-50	Interim action. Confirm results within two weeks. Resample affected location monthly. More frequent indoor air monitoring will be performed if results are confirmed. <sup>2</sup>	Moderate Increased Risk. For benzene, potential lifetime excess cancer risks arising from a 25-year exposure for adults exceed Superfund target risk range. For vinyl chloride, potential lifetime excess cancer risks arising from a 25-year exposure for adults are $\leq 1 \times 10^{-4}$ to $1 \times 10^{-3}$ .
Benzene Vinyl Chloride	>10,000 >5,000	>100 >50	Immediate interim action. Verify results within one week. Perform indoor air sampling within one month of confirmatory sampling. Assess effectiveness of the SVE remedy and well network. <sup>2</sup>	High Increased Risk. Concentrations exceed short-term toxicity values. For benzene, potential risk of hematological toxicity in workers exposed sub-chronically. For vinyl chloride, a potential risk of reproductive toxicity in males exposed sub-chronically.

<sup>1</sup>These values apply to site workers only. USEPA Region 9 Ambient Air PRGs will be used to assess risk to off-site residences.

<sup>2</sup>Soil gas or indoor air concentrations at these levels would trigger the need to provide engineering controls for building breathing air and for placement of SVE wells closer to the building.

7. Based on the sampling results from the soil gas wells, temporary soil gas probes are set in a pattern that initiates near the permanent well and steps outward towards buildings and site boundary. Soil gas samples will be analyzed first in the second mobile laboratory for COCs most representative of the soil gas plume at that location (i.e., the laboratory will be set up to screen for selected COCs). Based on elevated concentrations or unexplained peaks in the screening laboratory's chromatograms, selected samples may also be analyzed by the FASP laboratory. The objective of this effort is to define the extent of the soil gas plume(s), particularly in relation to onsite buildings and the site boundary.
8. For all buildings where the soil gas plume is determined to extend to at least one edge of the building, four temporary soil gas probes will be installed, one each along each wall of the building. These samples will be analyzed by the on-site screening laboratory with confirmation analyses performed by the FASP laboratory.
9. The results of the soil gas surveys will be used to target specific buildings for indoor air monitoring. Indoor air monitoring will most likely initiate during the later stages of the subsurface gas investigation.
10. For buildings that are not occupied over the weekend (i.e., closed up over the weekend), a 24-hour integrated air sample will be collected in a SUMMA canister on Sunday afternoon. This sample will represent a "worst case" analysis of the buildup of subsurface gas inside the building. The sample will be analyzed in the off-site Region 9 laboratory on a three-day turnaround based on Method TO-15.
11. If (1) no site VOCs are detected, (2) subsurface concentrations of COCs are below action levels, and (3) the methane concentration reflects the expected "regional" ambient concentration, then subsequent monitoring will be performed by LACDHS/SFSFD under the County's methane gas monitoring program.
12. If WDI site VOCs are detected in the 24-hour closed building sample, then the building will be targeted for a work day sampling event. This will involve the collection of an 8-hour integrated sample while the building is occupied during normal business hours. Location(s) of the sample(s) will be based on the results of the walkthrough survey, and will typically in be an active area of the building, away from chemical usage.
13. If the level of WDI site VOCs exceeds indoor air action levels in the 8-hour closed building sample, then the building may be targeted for a corrective measure. Such a measure could involve the installation of an automatic ventilation system that exhausts stale air in the building prior to building occupation on Monday morning.



14. If (1) the 8-hour work day sample has no detectable VOCs, (2) subsurface concentrations of COCs are below action levels, and (3) methane concentrations reflect the "regional" concentration, then USEPA WDI site monitoring of the building(s) will be ceased with subsequent monitoring performed by LACDHS/SFSFD.
15. If the 8-hour work day sample has detectable VOCs, the concentrations will be compared to indoor action levels to evaluate the need for a remedy. The building will be targeted for continued air monitoring until the proposed subsurface soil vapor extraction (SVE) treatability study demonstrates effectiveness in controlling soil gas migration below the buildings.
16. If subsurface soil gas concentrations exceed threshold levels, then indoor air monitoring will be continued until the effectiveness of the SVE system on the gas plume under the building is determined.
17. If subsurface gas concentrations exceed threshold levels at the site boundary, then USEPA will institute a community relations program and develop an off-site monitoring program.

## 9.0 SCHEDULE

Figure 7 presents the proposed schedule for completion of the field work identified in this Plan. This figure illustrates the relationships between soil gas and indoor sampling sequences. Also included in the figure are the approximate sample numbers by laboratory that are expected to complete the objectives of this study. In order to meet project schedules based on available capacity in the USEPA Region IX Richmond laboratory, a private laboratory will be contracted to perform the TO-15 and methane gas analyses, as needed.

Based on the current planning efforts, the field work identified in this Subsurface Gas Contingency Plan is scheduled to start on July 28, 1997 and continue through the month of August 1997.

**FIGURE 7 WASTE DISPOSAL INC. SITE  
SOIL GAS AND INDOOR AIR SAMPLING SCHEDULE AND SAMPLE NUMBERS**

	Week # 1 - 7/28						Week #2 - 8/4						Week # 3 - 8/11						Week # 4 - 8/18						Week # 5 - 8/25									
	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
Activity	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	D 10	D 11	D 12	D 13	D 14	D 15	D 16	D 17	D 18	D 19	D 20	D 21	D 22	D 23	D 24	D 25	D 26	D 27	D 28	D 29	D 30	D 31	D 32	D 33	D 34
Existing Soil Gas Wells																												Soil Gas Well Network						
On-Site Lab (FASP)	8	8	8	5																									13	13	13	12	12	
Off-Site Lab (Richmond)																																		
Screening Lab																																		
Off-Site Lab (Contract)	1	1	1	1																									1	1	2	2	1	
Soil Gas Probes																																		
On-Site Lab (FASP)					3			3	3	4	3	3			3	4	3	3	3			3	3	3	0	0								
Off-Site Lab (Richmond)																																		
Screening Lab					16			16	16	16	16	16			16	16	16	16	16			16	16	12	0	0								
Off-Site Lab (Contract)					1			1	0	0	0	0			1	1	0	0	0			1	0	0	0	0								
Indoor Air																																		
On-Site Lab (FASP)																																		
Off-Site Lab (Richmond)															10							10							8					
Screening Lab																																		
Off-Site Lab (Contract)																	20							20						15				

## 10.0 REFERENCES

- EBASCO Services Incorporated, 1989. *Final Subsurface-Gas Characterization Report, Waste Disposal Inc.* EPA contract 68-01-7250, May 1989.
- TRC Environmental Solutions, Inc. 1996. *Technical Memoranda No. 4 - Planned Design Modifications and Monitoring Network; No. 5 - Groundwater Sampling and Analysis Plan, Waste Disposal, Inc. Superfund Site.*
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